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IS 320 (1980): High Tensile Brass Rods and Sections (Other Than Forging Stock) [MTD 8: Copper and Copper Alloys]

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IS : 320 – 1980
(Reaffirmed 2006)

Indian Standard
**SPECIFICATION FOR
HIGH TENSILE BRASS RODS AND SECTIONS
(OTHER THAN FORGING STOCK)**

(Second Revision)

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(Including Amendment No. 1)

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November 1980

AMENDMENT NO. 1 JUNE 2004
TO
IS 320 : 1980 SPECIFICATION FOR
HIGH TENSILE BRASS RODS AND SECTIONS
(OTHER THAN FORGING STOCK)

(Second Revision)

(Page 3, clause 2.1, line 2) — Substitute 'IS 3288 (Part 3) : 1986†' for 'IS 3288 : (Part I)-1973†'.

(Page 3, footnote marked '†') — Substitute the following for the existing footnote:

'†Glossary of terms relating to copper and copper alloys : Part 3 Wrought forms.'

(Page 4, clause 3.1, line 2) --- Substitute 'IS 1387: 1993' for 'IS : 1387 - 1967*.*

(Page 4, footnote marked '') — Substitute the following for the existing:*

*'*General requirements for the supply of metallurgical materials (second revision)'.*

(Page 5, clause 6.1.1, line 1) — Substitute 'IS 1608 : 1995' for 'IS : 2654 - 1964*.*

(Page 5, footnote marked '') --- Substitute the following for the existing footnote:*

*'*Mechanical testing of metals — Tensile testing (second revision).'*

(Page 6, clause 6.2.1, line 2) --- Substitute 'IS 2305 : 1988', for 'IS : 2305 - 1962*.*

(Page 6, footnote marked '') — Substitute the following for the existing footnote:*

*'*Method for mercurous nitrate test for copper and copper alloys (first revision).'*

(Page 6, clause 8.1, line 2) — Substitute 'IS 2826 : 1986†' for 'IS : 2826 - 1980†'.

(Page 6, footnote marked '†') — Substitute the following for the existing footnote:

Amend No. 1 to IS 320 : 1980

'†Dimensions and tolerances for copper and copper alloys, rods and bars for general engineering purposes (*third revision*).'

(*Page 6, clause 8.2.1, line 1*)—Substitute 'IS 2826 : 1986†' for 'IS : 2826-1980†'.

(*Page 6, footnote marked '†'*) — Substitute the following for the existing footnote:

'†Dimensions and tolerances for copper and copper alloys, rods and bars for general engineering purposes (*third revision*).'

(*Page 6, clause 8.2.2, line 1*) — Substitute 'IS 2826 : 1986†' for 'IS 2826 : 1980†'.

(*Page 6, footnote marked '†'*) — Substitute the following for the existing footnote:

'†Dimensions and tolerances for copper and copper alloys, rods and bars for general engineering purposes (*third revision*).'

(*Page 7, clause 11.1, line 3*)—Substitute 'IS 1608:1995 *' for 'IS : 2654 - 1964*'.

(*Page 7, footnote marked '*'*) — Substitute the following for the existing footnote:

'*Mechanical testing of metals — Tensile testing (*second revision*).'

(MTD 8)

Indian Standard

**SPECIFICATION FOR
HIGH TENSILE BRASS RODS AND SECTIONS
(OTHER THAN FORGING STOCK)**

(Second Revision)

Copper and Copper Alloys Sectional Committee, SMDC 11

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(Continued on page 2)

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Indian Standard
SPECIFICATION FOR
HIGH TENSILE BRASS RODS AND SECTIONS
(OTHER THAN FORGING STOCK)
(Second Revision)

0. F O R E W O R D

0.1 This Indian Standard (Second Revision) was adopted by the Indian Standards Institution on 25 August 1980, after the draft finalized by the Copper and Copper Alloys Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 This standard was first published in 1951 and revised in 1962. In this revision, only two grades have been specified namely HT 1 which replaces Alloys 1 and 2 and HT 2 which replaces Alloy 3. Mechanical properties of HT 1 and HT 2 have also been modified. HT 1 is suitable for soldering and HT 2 is suitable for machining.

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers the requirements for rods and sections of high tensile brasses.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions as given in IS : 3288 (Part I)-1973† shall apply.

*Rules for rounding off numerical values (*revised*).

†Glossary of terms for copper and copper alloys: Part I Cast form and wrought form (main types) (*first revision*).

3. SUPPLY OF MATERIAL

3.1 General requirements relating to the supply of material shall be as laid down in IS : 1387-1967*.

4. CHEMICAL COMPOSITION

4.1 The material, when analyzed in accordance with IS : 3685-1966† shall have the chemical composition as given in Table 1.

TABLE 1 CHEMICAL COMPOSITION

CONSTITUENT	PERCENT	
	Grade HT 1	Grade HT 2
Copper plus incidental nickel	56·0-60·0	56·0-61·0
Tin	0·2-1·0	1·0 <i>Max</i>
Lead	*0·20-1·5	*0·50-1·5
Iron	0·20-1·25	0·20-1·5
Manganese	0·25-2·0	0·50-2·0
Aluminium	0·20 <i>Max</i>	0·3-2·0
Antimony, <i>Max</i>	†0·02	†0·02
Total other elements, <i>Max</i>	0·50	0·50
Zinc	Remainder	Remainder

Note — The chemical analysis for total impurities is not required if the supplier undertakes and certifies that the material does not contain impurities in excess of the limits specified.

*If material is required with lower lead content than that specified, it may be ordered with a maximum lead content of either 0·1 percent (lead free grade) or 0·5 percent.

†If required.

4.2 The supplier shall, when required, supply free of charge a copy of the manufacturer's works analysis of the material.

5. CONDITION OF DELIVERY

5.1 The rods and sections shall be delivered in the as-manufactured condition and finished by such cold-rolling, annealing or straightening as may be necessary to meet the properties as specified by the purchaser.

*General requirements for the supply of metallurgical materials (*first revision*).

†Methods of chemical analysis of brasses.

6. PHYSICAL PROPERTIES

6.1 Tensile Test

6.1.1 The material, when tested in accordance with IS : 2654-1964* shall have the tensile properties as given in Table 2.

TABLE 2 TENSILE PROPERTIES

GRADE	CONDITION	SIZE mm	TENSILE STRENGTH, Min	*0·2 PERCENT PROOF STRESS, Min	ELONGATION PERCENTAGE ON $5·65\sqrt{S_0}$ GAUGE LENGTH, Min
			(4)	(5)	(6)
(1)	(2)	(3)	MPa	MPa	
HT 1	M (As-manu- factured)	For all sizes	430	240	20
HT 1	Cold- worked and stress- relieved	Over 10 up to and includ- ing 40	480	—	12
		Over 40	460	—	15
HT 2	M (As-manu- factured)	For all sizes	460	280	20
HT 2	Cold- worked and stress- relieved	Over 10 up to and includ- ing 40	520	—	12
		Over 40	500	—	15

NOTE — 1 MPa = 0·102 kgf/mm².

*To be agreed between the purchaser and the supplier.

6.1.2 The fractured test piece shall be free from pipe and other harmful defects.

6.1.3 Should a tensile test piece break outside the middle third of its gauge length and the elongation percentage obtained be lower than the minimum specified, the test may be discarded and another test made.

*Method for tensile testing of copper and copper alloys.

6.2 Mercurous Nitrate Test

6.2.1 If required, the material may be subjected to the test as specified in IS : 2305-1962*.

6.2.2 The rods and sections shall not show any sign of cracking when subjected to this test.

7. FREEDOM FROM DEFECTS

7.1 The material shall be clean, smooth, free from surface defects, reasonably straight and free from twist.

8. SIZES AND TOLERANCES

8.1 Sizes — The material shall be supplied in sizes selected from IS : 2826-1980† as required by the purchaser.

8.2 Tolerances

8.2.1 For rods, the tolerances shall be as given in IS : 2826-1980†.

8.2.2 For rods other than those covered in IS : 2826-1980† and for sections, the tolerances shall be as agreed between the purchaser and the supplier, and shall be stated on the order.

9. SAMPLING

9.1 When tests are specifically called for by the purchaser, material (of the same type, size and temper) shall be grouped in batches as follows and one sample shall be selected from each batch or part thereof to provide the necessary test pieces:

Specified Size (Diameter or Width Across Flats) of Materials		Mass of Each Batch
Over	Up to and Including	
mm	mm	kg
—	12	250
12	40	500
40	80	1 000
80	—	2 000

*Method for mercurous nitrate test for copper and copper alloys.

†Dimensions for wrought copper and copper alloy rods and bars (for general engineering purposes) (second revision).

10. RETEST

10.1 Should any of the test pieces first selected fail in any of the prescribed tests, two further samples from the same batch shall be selected for testing, one of which shall be from the rod or section from which the original test sample was taken, unless the rod or section has been withdrawn by the supplier.

10.1.1 Should the test pieces from both these additional samples pass, the batch represented by the test samples shall be deemed to comply with this standard. In case the test pieces from either of these additional samples fail, the batch represented by the test samples shall be deemed not to comply with this standard.

11. PREPARATION OF TEST PIECES

11.1 Test Pieces for Tensile Test — Tensile tests shall be made on test pieces machined to the largest dimensions practicable. The test shall be done in accordance with IS : 2654-1964*.

11.2 Preparation of Test Pieces for Mercurous Nitrate Test — The test piece for mercurous nitrate test shall be of 150 mm length.

12. PACKING

12.1 The method of packing shall be as agreed to between the purchaser and the manufacturer.

13. MARKING

13.1 Suitable tag marked with grade, size, mass, name of the manufacturer and other information required by the purchaser shall be attached to each bundle of the material.

13.1.1 The product may also be marked with Standard Mark.

13.1.2 The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

*Method for tensile testing of copper and copper alloys.

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